The major source of carbon for starch synthesis in reserve tissues such as the potato (Solanum tuberosum L.) tuber is Suc. In the developing tuber, Suc is hydrolyzed principally by Suc synthase (EC 2.4.1.13) to UDP-Glc and Fru (Preiss, 1982). Fructokinase (EC 2.7.1.4) is believed to catalyze the phosphorylation of the Fru released to yield Fru-6-P. This sugar phosphate can then be used to support starch synthesis following further metabolism in the cytosol and amyloplast. There are some reports (Wolosiuk and Pontis, 1974) that Suc synthase activity can undergo feedback inhibition by free Fru. In this case fructokinase potentially plays an important role in maintaining the flux of carbon toward starch formation.

Fructokinase has been purified from a variety of plants including pea (Turner et al., 1977; Copeland et al., 1984), barley (Baysdorfer et al., 1989), avocado (Copeland and Tanner, 1988), and developing potato tubers (Gardner et al., 1992), but to date the corresponding gene has never been cloned from higher plants. A cDNA clone of the potato fructokinase gene has been isolated as a first step toward investigating more fully the role that fructokinase plays in carbohydrate metabolism in potato (Table I).

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LITERATURE CITED


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